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Mr. Steven V. Cary
U.S. Department of Energy
Deputy Assistant Secretary for Health Studies
Washington, DC

Subject: Rongelap Resettlement Support

Mr. Cary,

Rongelap Atoll experienced significant radioactive fallout from the Bravo test at Bikini Atoll on March 1, 1954. Under existing conditions, the key radiological concern for a resettled population on Rongelap Island is primarily limited to radioactive Cesium (Cesium-137) in soil or in locally harvested foods. The gamma radiation produced by Cesium-137 can penetrate the body and deliver an external (outside the body) or internal (from inside the body) radiation dose. Cesium-137 is taken up from the soil into all commonly grown foods such as coconut, *Pandanus* and breadfruit. Significant quantities of Cesium-137 may also be found in coconut crab. The internal dose delivered to people eating these foods will be directly proportional to the concentration of Cesium-137 in the food and the amount consumed. The external gamma dose will depend on the concentration of Cesium-137 in the soil and the amount of time spent in the area.

The Rongelap Atoll Local Government (RALG) has made good progress over the past 3 years developing the necessary island infrastructure to support a sustainable resettlement program. RALG also engaged the Department of Energy (DOE) and a group of independent scientists to develop recommendations to reduce the level of radiation exposure to a resident population living on the island. To this end, RALG accepted recommendations provided by scientists from the Lawrence Livermore National Laboratory (LLNL) aimed at reducing both the external and internal exposure from Cesium-137. Soil remediation work on and around the proposed community center on Rongelap Island is now nearing completion. This process involved limited soil removal and replacement of the soil with crushed coral fill. Studies conducted by the LLNL have since been able to verify that the combined effects of soil removal and addition of crushed coral is a highly effective method for reducing external gamma exposure rates.[1] Furthermore, we have seen a significant reduction in the amount of plutonium resuspension in the air that people breathe. We strongly recommend full implementation of these remedial measures in the community center, on and around other public buildings and all individual home sites. The combined effects of removing some soil and applying crushed coral around living areas, and adding potassium

fertilizer in the agricultural areas to reduce the amount of Cesium-137 taken up in locally grown foods is expected to reduce the level of radiation exposure in the resettled population to a level considered safe by the Marshall Islands Nuclear Claims Tribunal.

Fertilizer has been added to the area north of the community center on Rongelap Island and LLNL will soon be in a position to start sampling and verifying the effects of the potassium treatment on Cesium-137 uptake into plants. At the same time, resettlement workers living and working on Rongelap Island since 1999 who ate local foods have volunteered to have the amount of Cesium-137 in their bodies checked by whole body counting. Information from the whole body counter was then used to assess the internal dose to resettlement workers. The average internal dose to resettlement workers since 1999 is less than 1 mrem (0.01 mSv) per year. The highest individual dose observed over the same time period was less than 4 mrem (0.04 mSv) per year. The whole body counting program on Rongelap Island began in 1999 or well before the time that any potassium was added to the agricultural areas. These measurements show that workers living on the island today are not exceeding the recommended dose guideline of 15 mrem per year and tell us what exposure level a permanently resettled population could reasonably expect even before the potassium treatment takes full effect. The RALG-DOE resettlement support plan calls for spreading potassium fertilizer across the entire island. The process of clearing all the agricultural lands and spreading fertilizer will be very expensive. RALG has limited resources to accomplish this task while attempting to build homes for the resettled population. I believe that the data collected from the whole body counting program on Rongelap combined with supporting environmental studies indicating that Cesium-137 is removed from soil by rain and/or made less available for uptake into plants by naturally occurring environmental processes (other than radiological decay), gives RALG opportunity to re-evaluate their long-term remediation plan. Under an intervention strategy, remediation needs to be justified by taking into account social and economic factors. With this in mind, here is a list of suggestions for continued DOE support of the Rongelap resettlement program.

1. My first recommendation is the immediate introduction of a sample collection program for coconuts from the fertilized area north of the community center. These samples should be analyzed as quickly as possible and the results made available to RALG.

   On the basis of this information, RALG may decide that further remediation of the island is not cost-effective in terms of spending down their resettlement trust fund while only achieving a modest reduction in the total dose (internal + external). In essence, what I am suggesting is that RALG use the area north of the community center as large-scale experiment to determine the cost-benefit of the potassium treatment, perhaps allowing for wiser use of available resources in the future. Readers are reminded that under existing conditions it appears that resettlement workers on Rongelap Island are receiving an external dose of several mrem per year compared with internal doses from ingestion of Cesium-

137 of less than 1 mrem per year. Consequently, it also follows that DOE/LLNL should consider the need to develop a more accurate assessment of external dose rates on different parts of the island.

2. My second recommendation is that RALG remove surface soil around all homes and public buildings located outside the community center and replace the soil with crushed coral fill. The effectiveness of the soil remediation work should be verified after site preparation but before construction of any buildings.

If you should have any questions, please contact me at (925) 422-6621.

Regards,

Dr. Terry F. Hamilton
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[1] Hamilton et al., (2001). Rongelap Resettlement Support Preliminary Report Part 1. *In-situ* Gamma Spectrometric Measurements around the Service and Village Area on Rongelap Island, Lawrence Livermore National Laboratory (LLNL), Livermore, CA, UCRL-ID-143680-Pt.1, pp 16.

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